Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period: \_\_\_\_\_

**Pre-Lab: Cellular Respiration Experiment**

1. **In this lab activity:**

a) You will observe \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
b) You will investigate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Write the equation for cellular respiration:

3. What are the three ways in which you can measure the rate of cellular respiration?

4. Sketch a respirometer and label its important features.

5. As the organism inside the respirometer consumes oxygen, what happens to the water?

6. What happens to the CO2 that the organism produces?

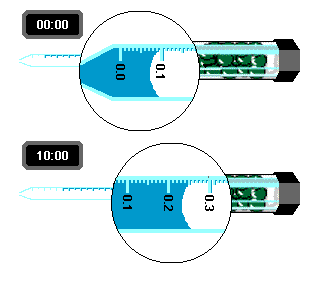
7. **Experimental Setup:** Read through the procedure, view the diagrams, and fill in the table given below. There are three different vials shown in the procedure—one with germinating peas, one with non-germinating peas, and one with glass beads only. Assume that Vials 1-3 are these three vials at our first temperature (10 degrees Celsius) and Vials 4-6 are these three vials at our second temperature (25 degrees Celsius).

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Vial 1 | Vial 2 | Vial 3 | Vial 4 | Vial 5 | Vial 6 |
| Contents |  |  |  |  |  |  |
| Temperature |  |  |  |  |  |  |

1. What is the purpose of comparing germinating vs. dormant seeds?
2. What is the purpose of including a vial with only glass beads?
3. Why are we changing the temperature in this experiment?

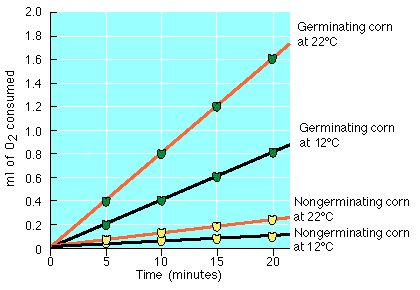
8. **Analyzing Results**

A) What is the equation to determine the rate of respiration?

B) What is X \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ What is Y \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. Read the respirometers and determine the rate of respiration. Show your calculations

10. **Self Quiz**



A) Describe the relationship between temperature and consumption of oxygen.

B) Calculate the rate of oxygen consumption for germinating corn at 12 degrees. (Show calculations)

C) Based on the graph, would you conclude that non germinating seeds respire?

11. **Extension** (You do not need the computer to complete this section)

A cricket is placed in a respirometer and data taken at three temperatures. The following table shows the data collected.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **mL of O2 consumed** | | |
| **Time (min)** | @ 10 degrees | @ 18 degrees | @ 25 degrees |
| 0 | 0.0 | 0.0 | 0.0 |
| 5 | 0.25 | 0.6 | 0.9 |
| 10 | 0.5 | 0.9 | 1.4 |
| 15 | 0.7 | 1.2 | 1.8 |
| 20 | 0.9 | 1.6 | 2.4 |

A) Graph the data. Make sure to include all elements of a proper scientific graph (you should know these!)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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B) Determine the rate of respiration for each of the three temperatures. (Show work)

C) Write a discussion / analysis paragraph where you evaluate your results and discuss the significance of these results. Identify two potential sources of error in this experiment (excluding human measurement error).